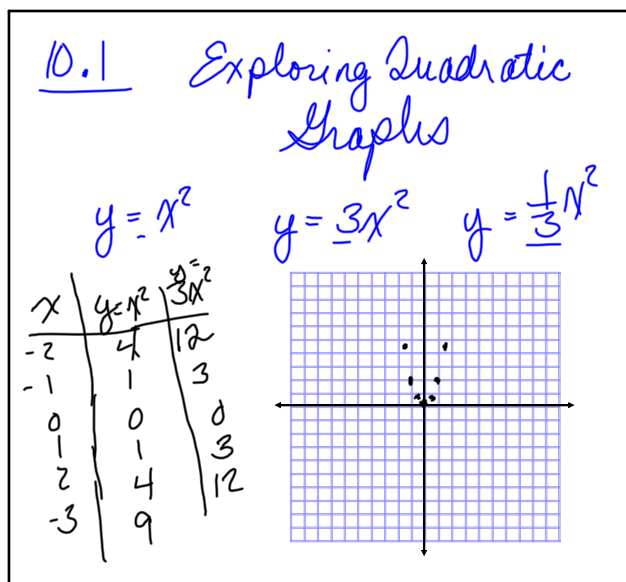
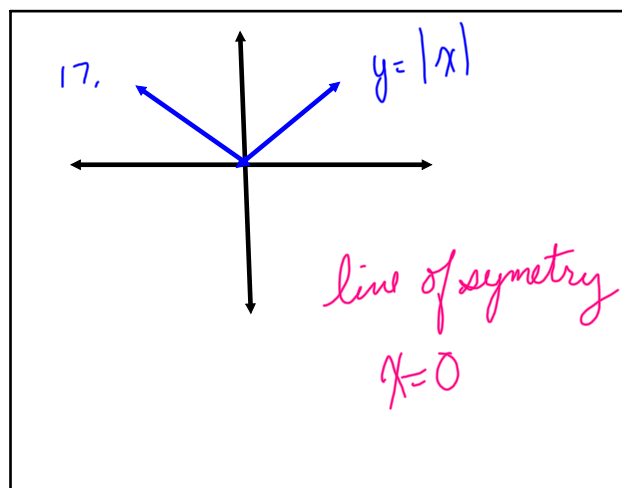
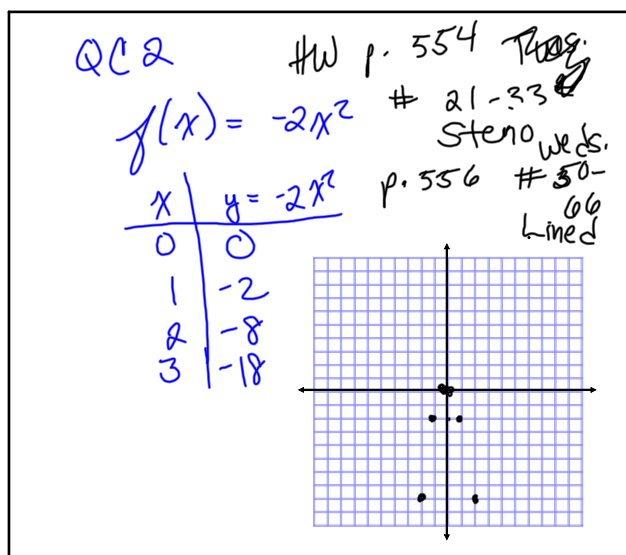
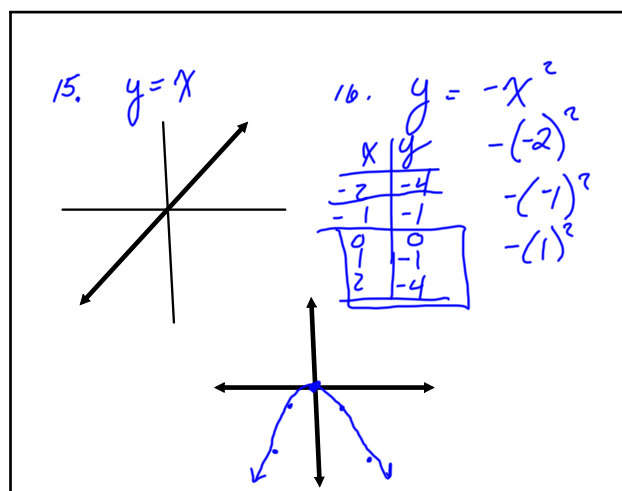


Chapter 10 p. 548

4. $\frac{b^2 - 4ac}{2a}$ $a = -1$
 $b = 3$
 $c = -2$

$\frac{(3)^2 - 4(-1)(-2)}{2(-1)}$ $\frac{9 - 8}{-2}$
 $\frac{9 - 4(2)}{-2}$ $\frac{1}{-2}$
 $-\frac{1}{2}$



Quadratic Functions

$y = ax^2 + bx + c$, $a \neq 0$
 (standard form)

ex. $y = 6x^2$ $y = x^2 + 2$
 $y = x^2 - x + 8$

Parent Function $\rightarrow f(x) = x^2$ parabola

axis of symmetry

Vertex (0,0) for $y = x^2$

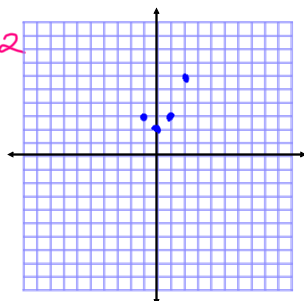
p. 554 #14

$$f(x) = x^2 + 2$$

Calculator

$$y = x^2 + 2$$

	x	y
	0	2
	1	3
	2	6



$$y = -x^2 + 2$$

p. 557

1. $a = -6$ $b = 4$

$$\frac{-b}{2a}$$

$$\frac{-(-4)}{2(-6)} = \frac{-4}{-12} = \left(\frac{1}{3}\right)$$

2. $\frac{-b}{2a} = \frac{-(-20)}{2(15)} = \frac{-20}{30} = \left(-\frac{2}{3}\right)$

3. $\frac{-b}{2a} = \frac{-7}{2} = \left(-3\frac{1}{2}\right)$

4. $\frac{-b}{2a} = \left(6\right)$

$$ax^2 + bx + c$$

y-intercept is (0,0)

 $y = ax^2 + bx + c$ has the line $x = \frac{-b}{2a}$ as the

axis of symmetry

$$y = 2x^2 + 2x \quad a = 2 \quad b = 2$$

$$x = \frac{-(-2)}{2(2)} = \frac{-2}{4} = -\frac{1}{2}$$

$$y = ax^2 + bx + c$$

$$y = 2x^2 + 4x - 3$$

$$y = 2(1)^2 + 4(1) - 3$$

axis of symmetry

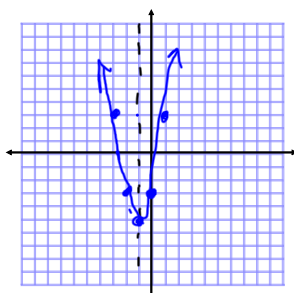
$$x = \frac{-b}{2a}$$

$$a = 2 \quad b = 4$$

$$x = \frac{-(-4)}{2(2)}$$

$$x = -1$$

vertex (-1, -5)



$$y = 2x^2 + 4x - 3$$

$$y = 2(-1)^2 + 4(-1) - 3$$

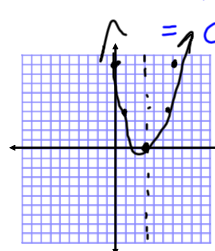
$$y = 2(1) - 4 - 3 = -5$$

$$f(x) = x^2 - 6x + 9$$

$$x = \frac{-b}{2a} = \frac{-(-6)}{2(1)} = \frac{6}{2} = 3$$

$$f(3) = 3^2 - 6(3) + 9$$

$$= 9 - 18 + 9$$



$$f(0) = 0^2 - 6(0) + 9$$

$$f(1) = 1^2 - 6(1) + 9$$

$$= 1 - 6 + 9$$

1. $y = 2x^2 + 4$ $x = \frac{-b}{2a}$
 $x = 0, (0, 4)$ $x = \frac{-(0)}{2(2)} = 0$

2. $f(x) = 2x^2 + 4x - 5$
 $x = \frac{-b}{2a} = \frac{-(4)}{2(2)} = -1$
 $(-1, -7)$ $f(-1) = 2(-1)^2 + 4(-1) - 5$
 $= 2 - 4 - 5 = -7$

3. $y = x^2 - 8x - 9$
 $x = \frac{-b}{2a} = \frac{-(-8)}{2(1)} = 4$ $(4, -25)$

4. $y = 3x^2 - 9x + 5$
 $x = 1.5$ $(1.5, -1.75)$


$f(1.5) = 3(1.5)^2 - 9(1.5) + 5$
 $3(2.25) - 13.5 + 5$ $\begin{array}{r} 1.5 \\ \times 1.5 \\ \hline 2.25 \end{array}$
 $6.75 - 13.5 + 5$
 $6.75 - 8.5$
 -1.75 $\begin{array}{r} 8.50 \\ -6.75 \\ \hline 1.75 \end{array}$

p. 559 Ex. 3

$y \leq x^2 - 3x - 4$
 $0 \leq -4$ no
 $y = x^2 - 3x - 4$ $y = (-1)^2 - 3(-1) - 4$
 $y = 1 + 3 - 4$

$x = \frac{-b}{2a} = \frac{-(-3)}{2(1)} = \frac{3}{2}$
 $x = \frac{3}{2}$

$y = \left(\frac{3}{2}\right)^2 - 3\left(\frac{3}{2}\right) - 4$
 $= \frac{9}{4} - \frac{9}{2} - 4 = 2\frac{1}{4} - 8\frac{1}{2} = -6.25$




1. $y = x^2 - 8x + 15$

2. $f(x) = -x^2 + 4x - 2$
 $x = \frac{-b}{2a} = \frac{-4}{2(-1)} = \frac{-4}{-2} = 2$

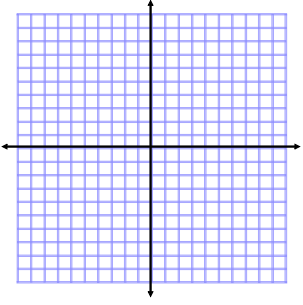
3. $y \leq -\frac{1}{4}x^2 - 2x - 6$

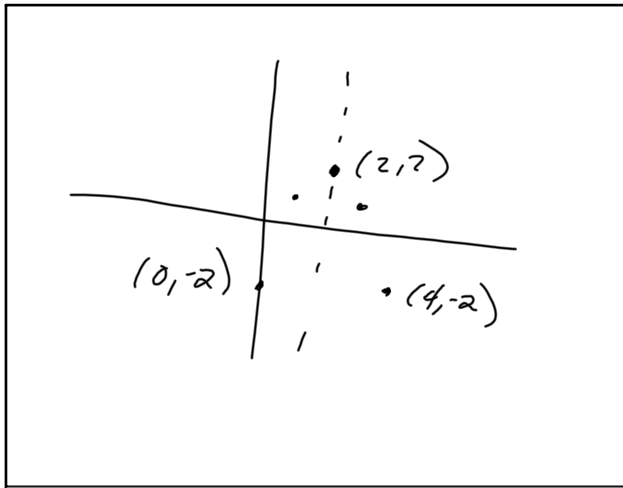
$2^2 - 8(2) + 15$

1. $y = x^2 - 8x + 15$
 $x = \frac{-b}{2a} = \frac{-(-8)}{2(1)} = 4$
 $y = 4^2 - 8(4) + 15 = 16 - 32 + 15 = -1$
 $(4, -1)$



27. $y = 2x^2$ 28. $y = -x^2$
 29. $y = 1.5x^2$ 30. $y = \frac{1}{2}x^2$





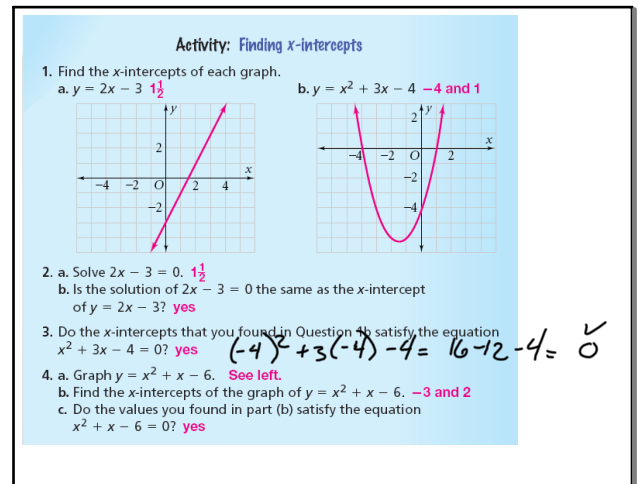
p. 565 5/21
10-3 Solving Quadratic Equations

2. $-\sqrt{81} - (-9) = (-9) \quad \sqrt{4} =$
 3. $\pm \sqrt{121} = (\pm 11) \quad \frac{\sqrt{1}}{\sqrt{4}}$
 4. $\sqrt{1.44} = (1.2) \quad \frac{\sqrt{144}}{\sqrt{100}} = \frac{12}{10} = 1.2$

8 $\pm \frac{1}{3}$
 9. $\frac{7}{10} \quad \sqrt{\frac{49}{100}} = \frac{\sqrt{49}}{\sqrt{100}} = \frac{7}{10}$

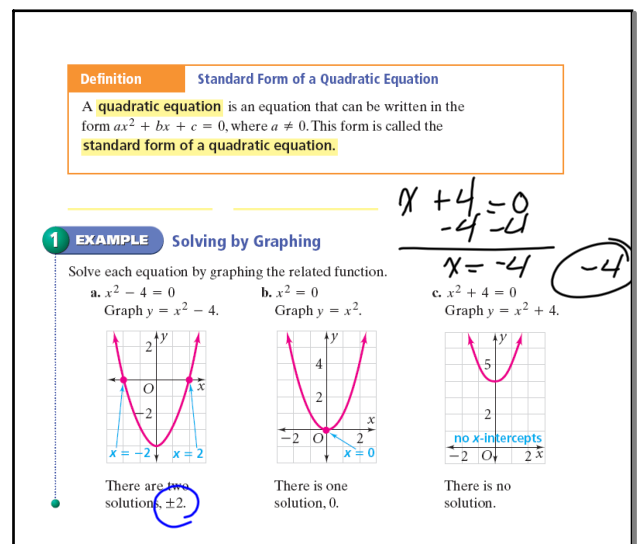
$y=0$
 $y = 2x - 3$
 $0 = 2x - 3$
 $+3 \quad +3$
 $\frac{3}{2} = \frac{2x}{2}$
 $1\frac{1}{2} = x$

$(1\frac{1}{2}, 0)$



$y = x^2 + x - 6$
 $x = \frac{-b}{2a} = \frac{-1}{2(1)} = -\frac{1}{2}$
 $y = (-\frac{1}{2})^2 + (-\frac{1}{2}) - 6 = -\frac{1}{4} - 6 = -6\frac{1}{4}$

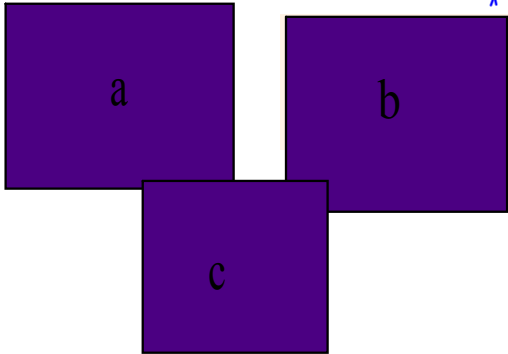
Homework p. 565 Blue #4



Quick Check 1 Solve each equation by graphing the related function. a-c. See margin.

a. $x^2 - 1 = 0$ b. $2x^2 + 4 = 0$ c. $x^2 - 16 = -16$

$+16 +16$
 $x^2 = 0$



2 EXAMPLE Using Square Roots $x^2 = -7$
no solution

Solve $2x^2 - 98 = 0$.

$2x^2 - 98 + 98 = 0 + 98$ Add 98 to each side.

$2x^2 = 98$

$\pm \sqrt{x^2} = \sqrt{49}$

$x = \pm \sqrt{49}$

$x = \pm 7$

Divide each side by 2.
Find the square roots.
Simplify.

2 Solve each equation.

a. $t^2 - 25 = 0$ ± 5 b. $3n^2 + 12 = 12$ 0

c. $2g^2 + 32 = 0$

no solution

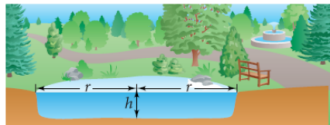
$2g^2 = -32$

$\sqrt{g^2} = \sqrt{-16}$

no solution

3 EXAMPLE Real-World Problem Solving p. 567

Gridded Response A city is planning a circular duck pond for a new park. The depth of the pond will be 4 ft and the volume will be 20,000 ft³. Find the radius of the pond to the nearest tenth of a foot. Use the equation $V = \pi r^2 h$, where V is the volume, r is the radius, and h is the depth.



$V = \pi r^2 h$

$20,000 = \pi r^2 (4)$ Substitute 20,000 for V and 4 for h .

$\frac{20,000}{(\pi \cdot 4)} = r^2$ Put in calculator-ready form. Solved for r^2

$\sqrt{\frac{20,000}{(\pi \cdot 4)}} = r$ Find the principal square root.

$39.89422804 \approx r$ Use a calculator.

The pond will have a radius of 39.9 ft.

3 A city is planning a circular fountain. The depth of the fountain will be 3 ft and the volume will be 1800 ft³. Find the radius of the fountain.

$\sqrt{1800 \div (\pi \cdot 3)}$

$1800 = \pi r^2 (3)$

$\frac{1800}{3\pi} = r^2$

$r = \sqrt{\frac{1800}{3\pi}}$

13.8197

HW: Steno
p. 568
28-39

13.8 ft

1. $6x^2 - 3x + 4$ Quadratic trinomial

2. $7x^3 + 5x$ cubic binomial

5. $(x^2 - 3x + 5) + (x^2 + 2x - 3)$

$2x^2 - x + 2$

13. $(x+6)(x-6)$

$x^2 - 36$

20. $2x^2 - 5x - 3$

$$\begin{array}{c|cc|c} F & 0 & 1 & L \\ 1 \cdot 2 & 1 & -6 & -3 \cdot 1 \end{array}$$

$$(x-3)(2x+1)$$

21. $3x^2 + 14x + 8$

$$\begin{array}{c|cc|c} F & 0 & 1 & L \\ 1 \cdot 3 & 4 & 6 & 2 \cdot 4 \times \\ & 2 & 12 & 4 \cdot 2 \checkmark \end{array} \quad (x+4)(3x+2)$$

33. $16x^2 + 48x + 36$ ← Perfect Square Trinomial

$4(4x^2 + 12x + 9)$

$4(2x+3)^2$

$(4x+6)^2$

Not completely factored

$$(2(2x+3))^2$$

$$4(2x+3)^2$$

37. $64x^2 + 40x + 6$

$2(32x^2 + 20x + 3)$

$$2(4x+1)(8x+3)$$

$$\begin{array}{|c|c|c|} \hline 4x & 32x^2 & 12x \\ \hline 1 & 8x & 3 \\ \hline \end{array}$$

$$(8x+3)$$

38. $14x^2 - 56$

$2(7x^2 - 28)$

$$2 \cdot 7 (1x^2 - 4)$$

$$14(x^2 - 4)$$

$$14(x+2)(x-2)$$

$$\begin{array}{r} 96 \\ 1 \ 96 \\ 2 \ 48 \\ 3 \ 32 \\ 4 \ 24 \\ 6 \ 16 \\ 8 \ 12 \checkmark \end{array}$$

24. $\left[(x+4)(x+5) \right] - \left[x(x-3) \right]$

$$\left[x^2 + 9x + 20 \right] - \left[x^2 - 3x \right]$$

$$x^2 + 9x + 20 - x^2 + 3x$$

$12x + 20$

25.

$$\begin{array}{c} \boxed{9x^2 + 6x + 1} \\ S \end{array}$$

$$\sqrt{S^2} = \sqrt{9x^2 + 6x + 1}$$

$$S = (3x + 1)$$

15. 80 ft fence

$A = 40x - x^2$ Let $x = \text{width}$

$$x = \frac{-b}{2a} = \frac{-(-40)}{2(-1)} = \frac{-40}{-2} = 20$$

$$b. A = 40(20) - 20^2$$

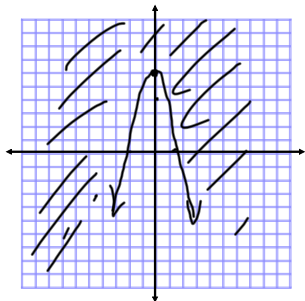
$$400 \text{ ft}^2$$

21.

$$y \geq -2x^2 + 6$$

$$0 \geq -2(0)^2 + 6$$

$$0 \geq 6 \quad \text{No}$$



42. Sports p. 562

$$h = -4.9t^2 + 3.8t + 1.7 \quad \times \frac{10}{10}$$

$$t = \frac{-b}{2a} = \frac{-(3.8)}{2(-4.9)} = \frac{-3.8}{-9.8} =$$

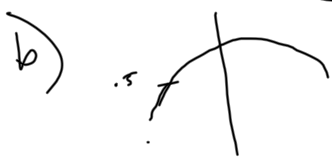
$$h = -4.9(0.6)^2 + 3.8(0.6) + 1.7 = \frac{38}{98} = \frac{19}{49}$$

$$h = 2.23 \text{ m}$$

No, it is not high enough $\approx \frac{20}{50} (0.4)$ sec.

44. $h = -4.9t^2 + 3.8t + 0.5$

a) $t = \frac{-b}{2a} = 0.4 \text{ sec.}$



$$y = \frac{1}{4}x^2 - 1$$

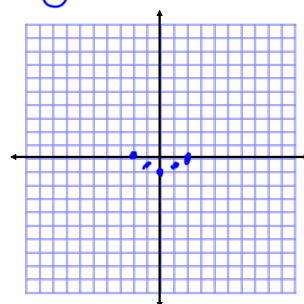
$$\frac{1}{4}x^2 - 1 = 0$$

$$\frac{1}{4}(2^2) - 1 = 0$$

$$\frac{1}{4}(4)^2 - 1 = 0$$

$$\frac{4}{4} - 1 = 0? \quad \checkmark$$

$$\times \frac{1}{4}(16) - 1 = 0$$



p. 567

15. $4r^2 = 25$

$$r^2 = \frac{25}{4}$$

$$r = \pm \sqrt{\frac{25}{4}} = \frac{\pm 5}{2}$$

$$\pm \sqrt{9 \cdot 3} = \pm 3\sqrt{3}$$

$$\pm \sqrt{9 \cdot 3}$$

16. $64p^2 = 4$

$$p^2 = \frac{4}{64} = \frac{1}{16}$$

$$\pm \frac{1}{4}$$

17. $6w^2 - 24 = 0$

$$6w^2 = 24$$

$$w^2 = 4 \quad w = \pm 2$$

18. $27 - y^2 = 0$

$$-y^2 = -27$$

$$y^2 = 27$$

$$y = \pm \sqrt{27}$$

19.

① $A = 250 \text{ m}^2$

$$A = s^2$$

② $s^2 = 250$

$$s = \pm \sqrt{250}$$

$$s = \pm 16$$

③ 16 m on one side

20.

90 ft² \times

$$x^2 = 90$$

$$x = \pm \sqrt{90}$$


$$\sqrt{9 \cdot 10} = \sqrt{9} \cdot \sqrt{10}$$

$$3\sqrt{10} \text{ ft}$$

$$= \pm 3\sqrt{10}$$

$$\approx 9.5 \text{ ft}$$

21. $A = 80 \text{ cm}^2$



$$A = \pi r^2$$

$$80 = \pi r^2$$

$$r^2 = \frac{80}{\pi}$$

$$r = \pm \sqrt{\frac{80}{\pi}}$$

$$r = 5.05 \text{ cm}$$

$\sqrt{(80/\pi)}$

10.4 p. 572 Factoring to Solve Quadratic Equations

1. $6 + 4m = 2$

$$4m = -4$$

$$m = -1$$

2. $\frac{a}{8} - 9 = 4$

$$\frac{a}{8} = 13$$

$$a = 80 + 24 = 104$$

$6 + 4m = 2$

$$\begin{array}{r} 6 + 4m = 2 \\ -6 \\ \hline 4m = -4 \\ : 4 \\ \hline m = -1 \end{array}$$

3. $7g + 16 = -3$

$$7g = -19$$

$$g = \frac{-19}{7} = -2\frac{5}{7}$$

4. $2c^2 + 29c + 14$

F O I L

2	1	2	14
1	14	1	2

$(2c + 1)(c + 14)$

14

$(2c + 1)$

$2c^2 + 29c + 14$

$2c^2 + 28c + c + 14$

$2c^2 + 29c + 14$

5. $3p^2 + 32p + 20$

F O I L

1	3	1	2
3	2	3	1

$(p + 10)(3p + 2)$

6. $4x^2 - 21x - 18$

F O I L

1	4	3	-6
3	-6	1	3

$(x - 6)(4x + 3)$

Zero-Product Property

if $ab = 0$, then $a = 0$ or $b = 0$

$(x + 3)(x + 2) = 0$

$x + 3 = 0$ or $x + 2 = 0$

$x = -3$ or $x = -2$

QC 1 a. $(x + 7)(x - 4) = 0$

$x + 7 = 0$ or $x - 4 = 0$

$x = -7$ or $x = 4$

b. $(3y - 5)(y - 2) = 0$

$\frac{5}{3}$ or 2 $\left\{ \frac{5}{3}, 2 \right\}$

c. $(6k + 9)(4k - 11) = 0$

$6k + 9 = 0$ $4k - 11 = 0$

$k = -\frac{3}{2}$ or $k = \frac{11}{4}$ $\left\{ -\frac{3}{2}, \frac{11}{4} \right\}$

d. $(5h + 1)(h + 6) = 0$

$\left\{ -\frac{1}{5}, -6 \right\}$

$$x^2 + 6x + 8 = 0 \rightarrow$$

$$(x+2)(x+4) = 0$$

$$(x+2)=0 \text{ or } (x+4)=0$$

$$x = -2 \quad x = -4$$

$\{-4, -2\}$
 $(-4, 0) \quad (-2, 0)$
 Roots of the Quadratic
 equation
 (zeros)

QC #2

$$x^2 - 8x - 48 = 0$$

$$\frac{-48}{+4 -12}$$

$$(x+4)(x-12) = 0$$

$$x+4=0 \text{ or } x-12=0$$

$$x = -4 \quad x = 12$$

$$\{-4, 12\}$$

$$(-4, 0) \quad (12, 0)$$

QC #3 p. 573

$$x^2 - 12x = -36$$

$$x^2 - 12x + 36 = 0$$

$$(x-6)(x-6) = 0$$

$$x = 6$$



Diagram of a rectangle with area $A = 160 \text{ in}^2$ and dimensions $16 \text{ in} \times 10 \text{ in}$. The width is labeled $2x-4$ and the height is labeled x . The area is calculated as $x(2x-4) = 160$.

$$2x^2 - 4x = 160$$

$$2x^2 - 4x - 160 = 0$$

$$x^2 - 2x - 80 = 0$$

$$(x-10)(x+8) = 0$$

$$x = 10 \text{ or } x = -8$$

21.

$$xy = 36$$

$$y = x+5$$

-9 and -4

$$x(x+5) = 36$$

$$x^2 + 5x = 36$$

$$x^2 + 5x - 36 = 0$$

$$(x+9)(x-4) = 0$$

$$\{-9, 4\}$$

3.

$$(x, y)$$

Parallel

$$y = -3x - 1$$

$$\frac{y-y_1}{x-x_1} = m$$

slope

$$-3$$

$$(y-y_1) = m(x-x_1)$$

$$y - (-1) = -3(x - (-2))$$

$$y + 1 = -3(x + 2)$$

$$y + 1 = -3x - 6$$

$$y = -3x - 7$$

$$85 = \frac{88 + 90 + 80 + x}{4}$$

Use the Zero-Product Property to solve each equation.

1. $(x+5)(x-3) = 0$

2. $(x-2)(x+9) = 0$

3. $(b-12)(b+12) = 0$

$$(x+5)=0 \text{ or } x-3=0$$

$$\{-5, 3\}$$

$$\{-9, 2\}$$

$$\{-12, 12\}$$

7. $(3x-7)(2x+1) = 0$

8. $(8y-3)(4y+1) = 0$

9. $(5x+6)(4x+5) = 0$

$$\{-\frac{1}{2}, \frac{7}{3}\}$$

$$\{-\frac{1}{4}, \frac{3}{8}\}$$

$$\{-\frac{6}{5}, -\frac{5}{4}\}$$

$$-\frac{6}{5} \quad -\frac{5}{4}$$

Solve by factoring.

10. $x^2 + 5x + 6 = 0$

11. $b^2 - 7b - 18 = 0$

12. $r^2 - 4 = 0$

$$(x+2)(x+3)=0$$

$$\{-3, -2\}$$

$$b+9=\frac{8}{-1}=-8 \quad \{-2, 2\}$$

$$(b-9)(b+2)=0$$

$$\{-2, 9\}$$

25. $2n^2 - 5n = 12$

26. $3m^2 - 5m = -2$

27. $5s^2 - 17s = -6$

$$2n^2 - 5n - 12 = 0$$

$$3m^2 - 5m + 2 = 0$$

$$5s^2 - 17s + 6 = 0$$

$$(5-3)(5s-2)=0$$

$$(3m-2)(m-1)=0$$

$$3m=2 \quad m=1$$

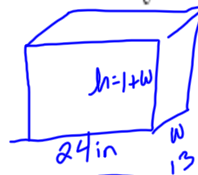
$$2n^2 - 5n - 12 = 0$$

$$(2n+3)(n-4)=0 \quad n=\frac{3}{2}$$

$$\{-\frac{3}{2}, 4\}$$

$$\{\frac{2}{3}, 1\}$$

31. Suppose you are building a storage box of volume
- 4368 in.^3
- . The length of the box will be 24 in. The height of the box will be 1 in. more than its width. Find the height and width of the box.



$$13 \text{ in}, 14 \text{ in}$$

$$V = 4368 \text{ in}^3$$

$$V = L \times W \times H$$

$$4368 = 24(w)(1+w)$$

$$4368 = 24(w+w^2)$$

$$4368 = 24w + 24w^2$$

33. $-\frac{1}{4}x^2 + 3 = 0$

$$-\frac{1}{4}x^2 = -3$$

$$x^2 = 12$$

$$x = \pm\sqrt{12}$$

$$\pm 2\sqrt{3}$$

38. $1.2g^2 - 7 = -34$

$$1.2g^2 = -27$$

$$g^2 = \frac{-27}{1.2}$$

$$\text{no solution}$$

$$\pm \frac{3}{7}$$

39. $\sqrt{4r^2 - \pi r^2} = 80$

$$r^2(4 - \pi) = 80$$

$$r^2 = \frac{80}{4 - \pi}$$

$$r = \sqrt{\frac{80}{4 - \pi}}$$

$$r = \sqrt{80 \div (4 - \pi)} = 9.7 \text{ in}$$

$$2r = 2(9.7) = 19.4$$

$$182 = w + w^2$$

$$0 = w^2 + w - 182$$

$$0 = (w+14)(w-13)$$

$$w = \cancel{14} \quad w = 13$$

$$\begin{array}{r} 182 \\ 2 \overline{) 182} \\ \underline{4} \\ 18 \\ \underline{18} \\ 0 \end{array}$$

5/29
p. 573 Qc #4



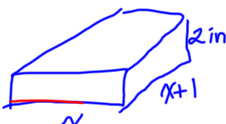
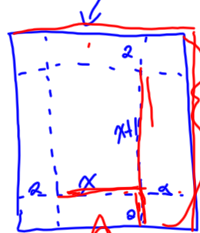
288 in^2

$$x+2+3+3 = x+8$$

$$x+3+3 = x+6$$

$$(x+6)(x+8) = 288$$

$A = 182 \text{ in}^2$ $9'' \times 10'' \times 2''$



$$(x+1+2)(x+2+2) = 182$$

$$(x+5)(x+4) = 182$$

$$x^2 + 9x + 20 = 182$$

$$x^2 + 9x - 162 = 0$$

$$(x-9)(x+18) = 0$$

$$x = 9 \quad x = \cancel{-18}$$

$$\begin{array}{r} 182 \\ 2 \overline{) 182} \\ \underline{4} \\ 18 \\ \underline{18} \\ 0 \end{array}$$

p. 574 #32



$$(x+1+1)(x+4) = 10''$$

$$(x+4)(x+2) = 80$$

$$x^2 + 6x + 8 = 80$$

$$x^2 + 6x - 72 = 0$$

$$(x-6)(x+12) = 0$$

$$x = 6 \quad x = \cancel{-12}$$

p. 579 10-5

Completing the Square

1. $d^2 - 8d + 16$

2. $x^2 + 22x + 121$

3. $k^2 - 16k + 64$

4. $(b+5)^2$

5. $(t+7)^2$

6. $(n-9)^2$

$$b = 2 \sqrt{ac}$$

$$\sqrt{(x+3)^2} = \sqrt{5}$$

$$(x+3) = \pm \sqrt{5}$$

$$x = -3 \pm \sqrt{5}$$

$$-0.764 \quad -5.236$$

$$\{-5.236, -0.764\}$$

you try it!

$$(x+8)^2 = 12$$

$$x+8 = \pm\sqrt{12}$$

$$x = -8 \pm \sqrt{12}$$

$$x^2 + 9x = 136$$

$$x^2 + 10x + 25$$

$$x^2 + 6x + 9$$

not a perfect sq. trinomial....yet!

$$x^2 + 9x + \left(\frac{9}{2}\right)^2 = 136 + \left(\frac{9}{2}\right)^2$$

$$\left(x + \frac{9}{2}\right)^2 = 136 + \frac{81}{4} = 156\frac{1}{4}$$

$$x + \frac{9}{2} = \pm\sqrt{156\frac{1}{4}} \quad \text{not!}$$

$$x^2 + 10x = 20$$

$$x^2 + 10x + \frac{5^2}{2} = 20 + \frac{25}{2}$$

$$(x+5)^2 = 45 \rightarrow x+5 = \pm\sqrt{45}$$

$$x = -5 \pm \sqrt{45}$$

QC #2

HW: p. 582 #1-18
steno

$$m^2 - 6m = 247$$

$$m^2 - 6m + 9 = 247 + 9$$

$$(m-3)^2 = 256$$

$$m-3 = \pm\sqrt{256}$$

$$m-3 = \pm 16$$

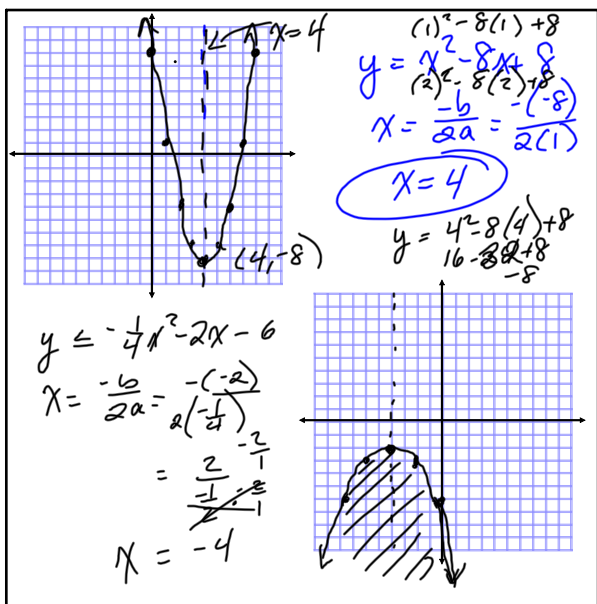
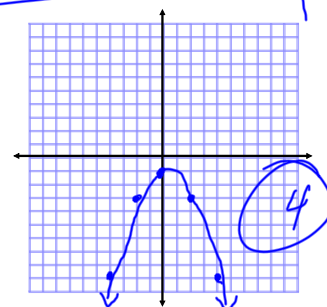
$$m = 3 \pm 16 \quad \{-13, 19\}$$

$$y = x^2$$

(0, -1) Maximum

$$y = -\frac{1}{2}x^2 - 1$$

x	y
2	-3
4	-5

width
vertex
direction

$$8. \quad x^2 - 10x = 40$$

$$x^2 - 10x + (-5)^2 = 40 + (-5)^2$$

$$(x-5)^2 = 40 + 25$$

$$\sqrt{(x-5)^2} = \sqrt{65}$$

$$x-5 = \pm\sqrt{65}$$

$$x = 5 \pm \sqrt{65}$$

$$\{-3.06, 13.06\}$$

$$\begin{aligned}
 m^2 + 6m &= 9 \\
 m^2 + 6m + 3^2 &= 9 + 3^2 \\
 (m+3)^2 &= 18 \\
 m+3 &= \pm\sqrt{18} \\
 m &= -3 \pm \sqrt{18} \\
 &= -3 \pm 3\sqrt{2} \\
 &= \{-7.24, 1.24\}
 \end{aligned}$$

$$\begin{aligned}
 r^2 - 2r - 35 &= 0 \\
 r^2 - 2r &= 35 \\
 r^2 - 2r + (-1)^2 &= 35 + (-1)^2 \\
 (r-1)^2 &= 36 \\
 r-1 &= \pm\sqrt{36} \\
 r &= 1 \pm \sqrt{36} \\
 &= \{-5, 7\}
 \end{aligned}$$

$$\begin{aligned}
 9. \quad g^2 + 22g &= -85 \\
 g^2 + 22g + (11)^2 &= -85 + (11)^2 \\
 (g+11)^2 &= -85 + 121
 \end{aligned}$$

$$\begin{aligned}
 18. \quad a^2 + 9a - 682 &= 0 \\
 a^2 + 9a + \left(\frac{9}{2}\right)^2 &= 682 + \left(\frac{9}{2}\right)^2 \\
 \left(a + \frac{9}{2}\right)^2 &= 682 + \frac{81}{4} \\
 a + \frac{9}{2} &= \pm\sqrt{682 + \frac{81}{4}} = \pm\sqrt{\frac{2728 + 81}{4}} = \pm\sqrt{\frac{2809}{4}} \\
 a + \frac{9}{2} &= \pm\frac{53}{2} \\
 a &= -\frac{9}{2} \pm \frac{53}{2} = \frac{-9 \pm 53}{2} = \frac{44}{2} = 22 \text{ or } \frac{-62}{2} = -31
 \end{aligned}$$

QC 4 p. 581

$$\begin{aligned}
 a. \quad \frac{4a^2 - 8a}{4} &= \frac{24}{4} \\
 \frac{1}{4}(4a^2 - 8a) &= 6 \\
 a^2 - 2a &= 6 \\
 a^2 - 2a + (-1)^2 &= 6 + (-1)^2 \\
 (a-1)^2 &= 7 \\
 a-1 &= \pm\sqrt{7} \\
 a &= 1 \pm \sqrt{7}
 \end{aligned}$$

$$\begin{aligned}
 n. \quad \frac{5n^2 - 3n - 15}{5} &= \frac{10}{5} \quad \text{p. 582} \\
 &\quad \text{\#19-34} \\
 &\quad \text{due Tues -} \\
 &\quad \text{Lined} \\
 n^2 - \frac{3}{5}n - 3 &= 2 \\
 n^2 - \frac{3}{5}n + \left(\frac{3}{10}\right)^2 &= 5 + \left(\frac{3}{10}\right)^2 \\
 \left(n - \frac{3}{10}\right)^2 &= 5 + \frac{9}{100} \\
 \left(n - \frac{3}{10}\right)^2 &= 5.09 \\
 n - \frac{3}{10} &= \pm\sqrt{5.09} \\
 n &= \frac{3}{10} \pm \sqrt{5.09} \\
 &\quad \begin{matrix} -1.96 \\ 2.56 \end{matrix}
 \end{aligned}$$

Quadratic Formula $\frac{1}{2} \frac{b}{a} =$

$$\begin{aligned}
 ax^2 + bx + c &= 0 \\
 \frac{ax^2 + bx}{a} &= \frac{-c}{a} \\
 x^2 + \frac{b}{a}x &= \frac{-c}{a} \\
 x^2 + \frac{b}{a}x + \left(\frac{b}{2a}\right)^2 &= \frac{-c}{a} + \left(\frac{b}{2a}\right)^2 \\
 \left(x + \frac{b}{2a}\right)^2 &= \frac{-c}{a} + \frac{b^2}{4a^2} \\
 \sqrt{\left(x + \frac{b}{2a}\right)^2} &= \sqrt{\frac{-4ac + b^2}{4a^2}} \\
 x + \frac{b}{2a} &= \pm\sqrt{\frac{-4ac + b^2}{4a^2}} \\
 x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
 \end{aligned}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

QC 1a p. 580

$$x^2 - 2x - 8 = 0 \quad a = 1 \quad b = -2 \quad c = -8$$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-8)}}{2(1)} = \frac{2 \pm \sqrt{4 + 32}}{2}$$

$$= \frac{2 \pm \sqrt{36}}{2} = \frac{2 \pm 6}{2} = 4 \text{ or } -2$$

$$\{-2, 4\}$$

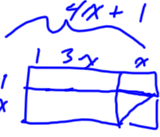
$$x^2 - 4x = 117$$

$$x^2 - 4x - 117 = 0 \quad a = 1, b = -4, c = -117$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-117)}}{2(1)}$$

$$\frac{4 \pm \sqrt{16 + 468}}{2} = \frac{4 \pm \sqrt{484}}{2} = \frac{4 \pm 22}{2}$$

$$\{-9, 13\}$$

43. 

$$A = (1+x)(4x+1) - \frac{x^2}{2}$$

$$A = 4x + 1 + 4x^2 + x - \frac{x^2}{2}$$

$$= 4x^2 + 5x + 1 - \frac{x^2}{2}$$

$$A = \frac{7}{2}x^2 + 5x + 1$$

$(3x+1)(1+x) + x + \frac{1}{2}x^2$

$$3x + 3x^2 + 1 + x + \frac{1}{2}x^2$$

$$3\frac{1}{2}x^2 + 5x + 1$$

$$\frac{7}{2}x^2 + 5x + 1$$

c. Area would be = 207.5 ft²

- Graph it
- Factor it
- Square Roots
- Complete the Square
- Quadratic Formula

$$x^2 + 5x + 1 = 200$$

$$x^2 + 5x - 199 = 0$$

$$x = \frac{-5 \pm \sqrt{25 + 796}}{2} = \frac{-5 \pm \sqrt{821}}{2}$$

$$x = \frac{-5 \pm 28.65}{2}$$

$$x = 11.8$$

45. $6x^2 + 6x + 100$

$$-20, 20 = 6$$

46. $x^2 - 14x + 49$

$$(1)^2 \quad (7)^2 \quad 2^2 \quad 6^2$$

$$96^2 + 666 + 121$$

$$3^2 \quad 11^2$$

47. ~~$8x^2 - 120x + 100$~~

$$x^2 + 6x - 11 = 0$$

$$x^2 + 6x + \left(\frac{6}{2}\right)^2 = 11 + 9$$

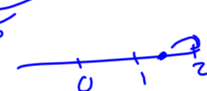
$$\sqrt{(x+3)^2} = \sqrt{20}$$

$$x+3 = \pm \sqrt{20}$$

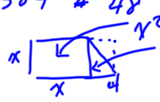
$$x = -3 \pm \sqrt{20}$$

$$x = -7.47 \text{ or } 1.47$$

$\sqrt{4.5}$



p. 584 # 48



$$\frac{4x}{2} = 2x$$

$$A = x^2 + 2x$$

$$200 = x^2 + 2x$$

$$x^2 + 2x + \left(\frac{2}{2}\right)^2 = 200 + 1$$

$$\sqrt{(x+1)^2} = \sqrt{201}$$

$$x+1 = \pm \sqrt{201}$$

$$x = -1 \pm \sqrt{201} \rightarrow \text{CALC} \rightarrow -15.18$$

13.18

49.

8×12
 $A = 96 \text{ ft}^2$

$8+x$ $12+x$
 $A_2 = 192 \text{ ft}^2$

$$(x+8)(x+12) = 192$$

$$x^2 + 20x + 96 = 192$$

$$x^2 + 20x - 96 = 0$$

$$(x-4)(x+24) = 0$$

$$x = 4, -24$$

positive

$$96 - 192 = -96$$

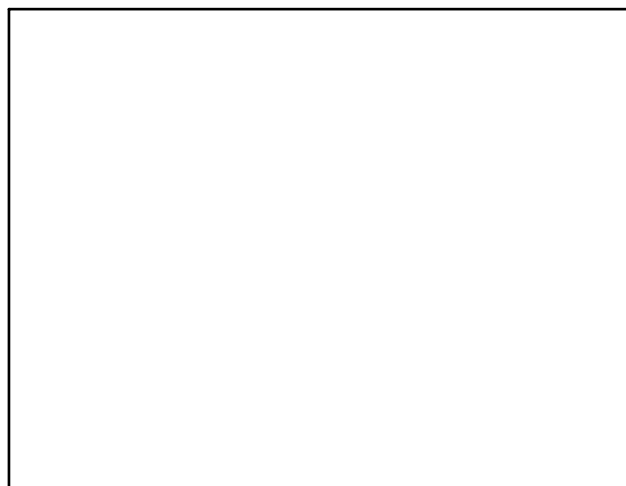
$$-96 \div 8 = -12$$

$$-12 \div 2 = -6$$

$$-6 \pm \sqrt{36 + 96} = -6 \pm \sqrt{132} = -6 \pm 11.49$$

$$x = 5.49, -17.49$$

5.49



$$\frac{7}{3} \div 2 = \frac{7}{6}$$

$$\frac{7}{3} \times \frac{1}{2}$$

$$\frac{8}{5} \times \frac{2}{2} = \frac{8}{10}$$

$$\frac{6}{7} \div 2 = \frac{6}{14}$$

Trust them with responsibility so that they become self-reliant, ambitious, resourceful. Help students develop a sense of adventure. (John Taylor Gatto)

$b^2 - 4ac$ tells about the solution

neg - no solution
 zero - one solution
 pos - two solutions

4. $-2x^2 + 4x - 2 = 0$ $x^2 - 2x + 1 = 0$
 $16 + 8(-2) = 0$ $(x-1)^2 = 0$
 $x-1 = 0$ 1

5. $-\frac{1}{2}x^2 + x + 3 = 0$

$$b^2 - 4ac$$

$$1^2 - 4\left(-\frac{1}{2}\right)(3)$$

$$1 + 6 = 7$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{-(-1) \pm \sqrt{7}}{2\left(-\frac{1}{2}\right)}$$

$$\frac{-1 \pm \sqrt{7}}{-1}$$

$$\{-1.65, 3.65\}$$

6. $5x^2 - 2x + 3 = 0$

$b^2 - 4ac$ no solution

~~$(-2)^2 - 4$~~

-56

1. $x^2 + 6x + 10 = 0$

2. $x^2 - 4x - 1 = 0$ $(-24, 4.24)$

$x^2 - 4x + (-2)^2 = +(-2)^2$
 $\sqrt{(x-2)^2} = \sqrt{5}$
 $(x-2) = \pm\sqrt{5}$
 $x = 2 \pm \sqrt{5}$

3. $(x+3)^2 = 0$

(-3)

~~$x^2 + 6x + 9 = 0$~~
 $\sqrt{(x+3)^2} = \sqrt{0}$

$(x+3)(x+3) = 0$

$(x+3) = 0$
 $x = -3$

$x = -3$

7. $3x^2 - 18x + 27 = 0$

$x^2 - 6x + 9 = 0$

$(x-3)^2 = 0$

(3)

8. $4x^2 - 8 = 0$ $b^2 - 4ac$
 0
 $\{-1.41, 1.41\}$

1. Graph it

2. Factor it

3. Square Roots

4. Complete the Square

5. Quadratic Formula

$x^2 - 2 = 0$
 yes because no x term
 $x^2 - 2 = 0$
 $+2 +2$
 $\sqrt{x^2} = \sqrt{2}$
 $x = \pm\sqrt{2}$

12. $8x^2 + 2 = 8x$

$4x^2 + 1 = 4x$

$4x^2 - 4x + 1 = 0$

$(2x-1)^2 = 0$

$16 - 16 = 0$

$2x - 1 = 0$

$2x = 1$

$x = \frac{1}{2}$ $(\frac{1}{2})$

$b^2 - 4ac$

$16 - 16$

$\{\frac{1}{2}\}$

1. Graph it
 2. Factor it $x^2 - 10x = 0$
 3. Square Roots $-5x(x+2) = 0$
 4. Complete the Square $-5x = 0$ $x+2=0$
 $x=0$ $x=-2$
 5. Quadratic Formula $\{-2, 0\}$

10. $-x^2 = 4x + 6$
 $-x^2 - 4x - 6 = 0$
 $0 = x^2 + 4x + 6$
 $16 - 24$
 11. $4x^2 = 9x - 3$
 $4x^2 - 9x + 3 = 0$
 $\frac{-(-9) \pm \sqrt{81 - 4(12)}}{8}$ $\{.41, 1.84\}$

1. Graph it \leftarrow if you are allowed
 2. Factor it \leftarrow if it's obvious
 3. Square Roots \leftarrow if there is no x term
 4. Complete the Square \leftarrow if no "a" term
 5. Quadratic Formula \leftarrow if not easily factored or complete

25.
 $h = -16t^2 + 39t$
 $25 = -16t^2 + 39t$
 $16t^2 - 39t + 25 = 0$
 $(-39)^2 - 4(16)(25)$

a) Find the number of solutions.
 b) Solve using best method.
 Show all work.

- $x^2 - 6x + 9 = 0$
- $2x^2 - 3x + 4 = 0$
- $5b^2 - 10 = 0$
- $2m^2 - 8m = -8$

p. 597
 L common difference
 $y = mx + b$ (slope-intercept form)
 Q $y = ax^2 + bx + c$
 E $y = a \cdot b^x$
 $Y = ax^2$
 $Ax + By = c$ standard form
 $y - y_1 = m(x - x_1)$ point slope form

Linear

$y = .4x + 7$

x	y
0	7
1	7.4
2	7.8
3	8.2

① $\begin{matrix} 7 \\ 7.4 \\ 7.8 \\ 8.2 \end{matrix} \begin{matrix} \\ .4 \\ .4 \\ .4 \end{matrix}$

② $y = .4x + b$ ← $.4$ is the common difference
 $7 = .4(0) + b$
 $7 = 0 + b$
 $7 = b$ ∴ linear
 ④ $y = .4x + 7$

x	y
2	2.1
3	2.7
4	3.3
5	3.9

Linear
 $m = .6$

$3 \times .6 = \frac{2.7}{1.8} \rightarrow .9$

$y = .6x + .9$

not linear

Quadratic

x	y
3	4.5
4	8
5	12.5
6	18

$\begin{matrix} 4.5 \\ 8 \\ 12.5 \\ 18 \end{matrix} \begin{matrix} \\ 3.5 \\ 4.5 \\ 5.5 \end{matrix} \begin{matrix} \\ 1.0 \\ 1.0 \end{matrix}$

$y = ax^2$
 $8 = a(4)^2$
 $8 = \frac{16a}{16}$
 $\frac{1}{2} = a$

$y = \frac{1}{2}x^2$

(2, 4.8) (3, 10.8) (4, 19.2) (5, 30)

not linear

Quadratic

x	y
2	4.8
3	10.8
4	19.2
5	30

$\begin{matrix} 4.8 \\ 10.8 \\ 19.2 \\ 30 \end{matrix} \begin{matrix} \\ 6.0 \\ 8.4 \\ 10.8 \end{matrix} \begin{matrix} \\ 2.4 \\ 2.4 \end{matrix}$

$y = ax^2$
 $30 = a(5)^2$
 $30 = \frac{25a}{25}$
 $\frac{6}{5} = a$
 $1.2 = a$

$y = 1.2x^2$

Exponential

$y = 5 \cdot (.3)^x$

x	y
1	1.5
2	.45
3	.135
4	.0405

$\begin{matrix} 1.5 \\ .45 \\ .135 \\ .0405 \end{matrix} \begin{matrix} \\ 1.65 \\ .315 \\ -.0945 \end{matrix}$

$y = a \cdot b^x$
 $y = a \cdot \left(\frac{3}{10}\right)^x$
 $1.5 = a \cdot \frac{3}{10}$
 $\frac{45}{150} = \frac{45}{150}$
 $\frac{1.5}{1.5} = \frac{3}{30} \left(\frac{3}{10}\right)$
 $\frac{1.35}{.45} = \frac{135}{450}$
 $\frac{27}{90} = \frac{3}{10}$
 Common Ratio
 ∴ Exponential

$\frac{3}{10}a = 1.5$
 $a = \frac{10}{3}(1.5)$
 $a = \frac{15}{3}$
 $a = 5$

$y = 5 \cdot (.3)^x$

x	y
1	24
2	144
3	864
4	5184
5	31,104

p. 601 #7-12

#9 p. 601

x	y
0	0
1	2.8
2	11.2
3	25.2
4	44.8

$$y = ax^2$$

$$2.8 = a$$

$$y = 2.8x^2$$

$\frac{11.2}{2.8}$	$\frac{25.2}{-11.2}$	$\frac{44.8}{25.2}$	$\frac{8.4}{-2.8}$	$\frac{14.0}{-8.4}$
8.4	14.0	19.6	5.6	5.6
			19.6	
			14.0	
			5.6	

p. 742

Extra practice
49-57

and as many
others as

you can
STENO
Test Wednesday